

## 2.0 ALTERNATIVES

### 2.1 Background

Representatives from the Corps, FWS, FFWCC, ENP, SFWMD, DERM, FDEP, and FDACS evaluated a number of options that had potential as solutions in satisfying the project purpose. These options included changes in operational criteria for existing structures throughout the region that could influence water levels within the various sparrow subpopulations. Two interagency modeling meetings were held to discuss potential options for meeting the criteria stated in the USFWS BO and to evaluate modeling runs produced by the Corps prior to the meetings. Changes in the operation of various structures were proposed during the meetings and in subsequent correspondence, and appropriate model runs were produced. The modeling runs were posted on the Corps Jacksonville District Website (<http://www.saj.usace.army.mil>) as each was produced. The interagency review team members were informed as the model runs were posted, and comments and suggestions were used to modify the potential alternative plans. The alternative model runs were compared to the 1995 Base conditions, which represents conditions under normal C&SF operations with Test 7, Phase I operations in the ENP/South Dade Conveyance System (SDCS) prior to Emergency Deviations and ISOP.

The federal agencies requested facilitators from the U.S. Institute for Environmental Conflict Resolution to assist the Corps, SFWMD, FWS and ENP to reach a consensus on a preferred alternative. On July 18, 2001, after four months of negotiation, the interagency team reached a consensus on a proposal for the IOP. This proposal was modeled using the SFWMM version 3.8 as Alternative 7.

#### 2.1.2. Base Conditions

The water management operations existed before Emergency deviations and ISOP was known as 95Base which included Test 7 Phase I. This base condition was modeled using SFWMM version 3.8 and was compared to the RPA, ISOP 2000, ISOP 2001, and IOP alternatives. In the latest regional computer modeling, 95Base was modified to include the use of S-355A&B and as a result, it was renamed 95Base Modified 2 (95BM2). Operational assumptions used to simulate 95BM2 are listed in Table 2.1.

#### 2.1.3. RPA Hydrologic Condition Requirements

The FWS BO has specific RPA requirements for the RPA. The RPA requirements are as follows:

addition, it specified that the Corps must provide at least 30, 45, and 60 percent of all regulatory water releases crossing Tamiami Trail enter ENP east of the L-67 Extension in 2000, 2001, and 2002, respectively.

With these RPA requirements, the Corps developed RPA100, RPA101, and RPA102 model runs to represent the conditions required by the B.O. for 2000, 2001 and 2002. These RPAs were replaced by RPA00, RPA01, and RPA02 because of improved operations of S-12 structures, the use of S-355A&B, and adjustment to WCA-2 and WCA-3A regulation schedules. Operational assumptions used in the modeling of these RPAs are listed in Table 2.2.

## 2.2. Description of Alternatives

One additional plan (Alternative 7) was selected for evaluation in this study.

addition, descriptions and operational components of the ISOP 2000 and ISOP 2001 plans are provided for comparison. The ISOP 2000 and ISOP 2001 are included to provide a basis of comparison as well as to include an analysis of these plans in the EIS.

### 2.2.1 ISOP 2000

ISOP 2000 was formulated through interagency agreement and implemented in December 1999. The model run that simulated ISOP 2000 (also known as ISOP9d) and its operational assumptions are listed in Table 2.3.

### 2.2.2 ISOP 2001

ISOP9d was changed slightly to better meet the requirements of the WCA 2A and 3A as

water supply and the environment in South Florida. Upon receiving comments from the

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population A. Gage NP-205 is located in the western marl prairies and is the key station for monitoring water levels in the Western Shark River Slough.

To achieve the hydrologic equivalence to the hydroperiods required by the FWS B.O. for the eastern marl prairies (sparrow sub-population C, E, and F habitats) and at the same time, maintain C&SF project goals and responsibilities, the Corps proposed to route regulatory releases from WCA-3A, that normally would be discharged directly through the western structures, through S-333 and S-334 structures, down L-31N canal, and into a 160-acre seepage area through S-332B pump. According to the regional modeling using SFWMM, when capacity is available S-332B must be pumped up to 325 cfs in order to meet the RPA requirements. The routing of WCA-3A through SDCS will require the lowering of L-31N canal from S-331 to S-176 and maximizing excess discharges to tide.

#### *2.2.3.2 Alternative 6*

Alternative 6 is identical to Alternative 5 with two exceptions: an additional 240 acre seepage area with weir overflow designed to flow back into L-31N canal and maximum pumping is limited to 250 cfs at S-332B pump station. The purpose of adding a new 240-acre reservoir is to minimize direct weir overflow into the ENP. By reducing pumping from 325 cfs to 250 cfs, potential weir overflow would be reduced. According to the

associated with overland flow, the model is an appropriate tool to use in the determination of water management operations that would produce hydroperiods that would meet the RPA requirements. Modeling results indicate that Alternative 6 meets and exceeds the RPA hydroperiod requirements for the eastern sparrow habitat. Detailed operational assumptions used in the regional water management modeling of Alternative 6 are listed in Table 2.5.

#### *2.2.3.3 Alternative 7*

Alternative 7 represents the IOP consensus proposal from the Corps, ENP, USFWS, and SFWMD collaborative process. Its most important feature that sets it apart from other alternatives is the dual mode of water management operations. In addition, Alternative 7 has three structural modifications.

##### Dual Mode of Operations

The dual mode of operations was derived by recognizing some fundamental operational issues in the plan. When the S-12 operations are reduced in order to decrease impacts to the western Cape Sable seaside sparrow habitats, the potential exists to increase water levels in WCA3A. The ISOP addressed this by moving some of the regulatory releases that cannot be passed through S-12D into the South Dade Conveyance System rather than directly onto western sparrow habitats. In order to mitigate for the increased inflow to the South Dade Conveyance System, the ISOP canal stages in the South Dade Conveyance System are lowered relative to Test 7 Phase I of the Experimental Water Deliveries. However, in the ISOP, these mitigation actions are implemented regardless of whether or not flow from WCA3A is entering the South Dade Conveyance System. According to the Department of the Interior (Coordination Act Report, p.126-129), these continuously lowered canal stages adversely impacted wetlands near L-31N. Alternative 7 addresses this concern by mitigating for the increased flow into the South Dade Conveyance System only when that action is occurring. This operational philosophy results in the operational rule set in Table 2.6.

The first mode of the operation rule set of Alternative 7 is designated as "No WCA-3A regulatory releases to SDCS" operation. During these times, the L-31N canal will be maintained at Test 7 Phase I level when there are no WCA-3A regulatory releases. This operation was proposed to address the concern from DOI that maintaining L-31N canal at

ISOP level would impact Park resources in NESRS.

The second set of operational rules which would apply when water is flowing from WCA-3A down and around the SDCS is called "WCA-3A regulatory releases to SDCS." During this operational phase, levels in L-31N canal would be lowered to minimize

equivalence to the RPA hydroperiods in the habitats of sparrow sub-populations C, E and F to provide adequate hydration in these habitats until MWD is operational. Because the SFWMM cannot simultaneously simulate two different modes of water management operations that depend on hydrologic conditions in WCA-3A, Alternative 7 was modeled in two separate runs. Hence the model run simulating the "No WCA-3A regulatory releases to SDCS" is ALT7a and the "WCA-3A regulatory releases to SDCS" is ALT7b.

### New Structural Features

Three structural modifications in Alternative 7 are degrading lower 4 miles of the L-67 extension levee, constructing an additional 240-acre seepage area at S-332B, and extending additional 30 feet of S-333 spillway apron.

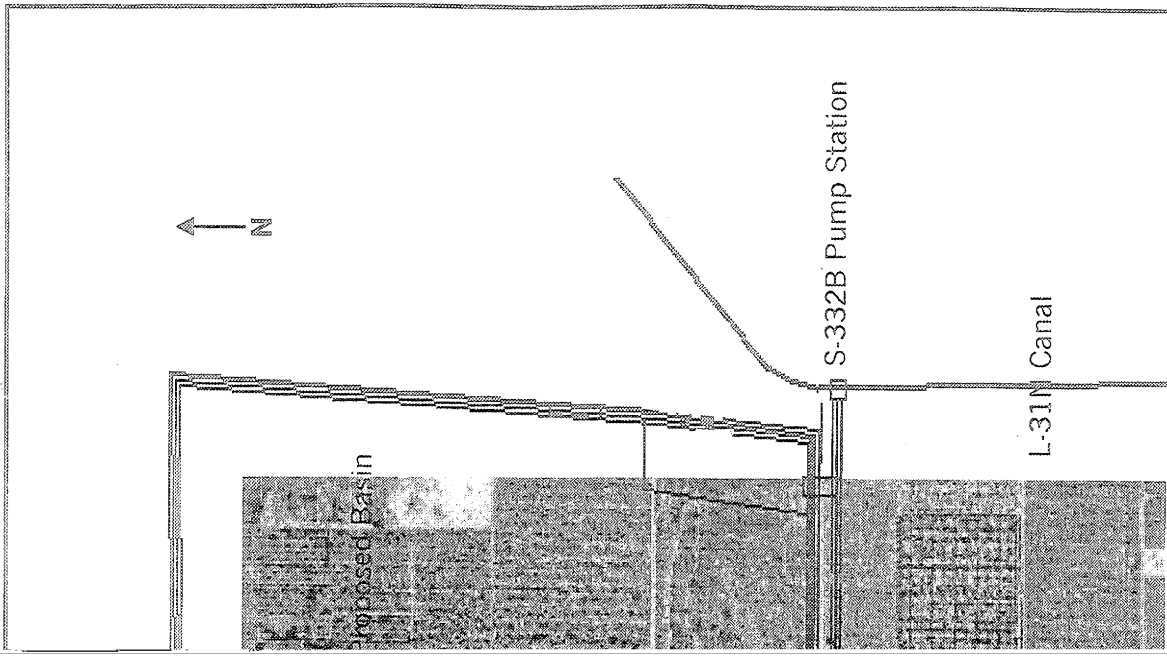
The degradation of the lower 4 miles of L-67 extension levee was proposed to allow water from New Shark River Slough (NSRS) to flow into the northern part of Shark River Slough (NESRS) and northern habitat area of sparrow sub-population E. According to the DOI, degrading the lower section of L-67 Extension will enhance hydroperiods in CSSS sub-population E and water flows and volumes in Shark Slough and the Shark Slough estuaries. Various lengths of the degradation were proposed and only 2, 4, and 6-mile sections were evaluated. Degrading a four-mile section was selected based on the results of the modeling that show a potential hydroperiod improvement in the western part of NESRS with minimum impact to ground water level in and around 8.5 SMA. Modeling results and the potential impacts due to L-67 Extension degradation are shown in Engineering Appendix from page A-94 to 101.

Building an additional seepage area of 240 acres at S-332B is proposed to avoid direct overflow into the Everglades National Park. The current seepage area is about 160 acres and has an average seepage rate of about 120 cfs during the wet season and about 190 cfs during the dry season. Cumulatively, both the existing 160-acre seepage area and the new 240-acre detention (total of 400 acres) are 2.5 times larger than the existing seepage area. Additionally, the new seepage reservoir is more than twice as deep as the original reservoir. Therefore, it is reasonable to estimate to assume that the combined seepage area of 400 acres would seep at least 250 cfs more than the amount needed to meet the RPA targets without direct weir overflow. In addition, the new seepage area will be constructed weir overflow back into L-31 canal, not the ENP. Therefore, with the additional seepage area and the reduction of pumping at S-332B from 325 cfs to 250 cfs, the potential for and frequency of weir overflow into the Park during normal operations would be significantly reduced. Overflow into the Park under pre-storm/storm/storm recovery operation would depend on several factors whose recurrence frequency cannot be predicted reliably. These factors are:

- Rainfall recurrence probability;
- Antecedent stages in canals;
- Groundwater or surface water levels;
- Antecedent rainfall.

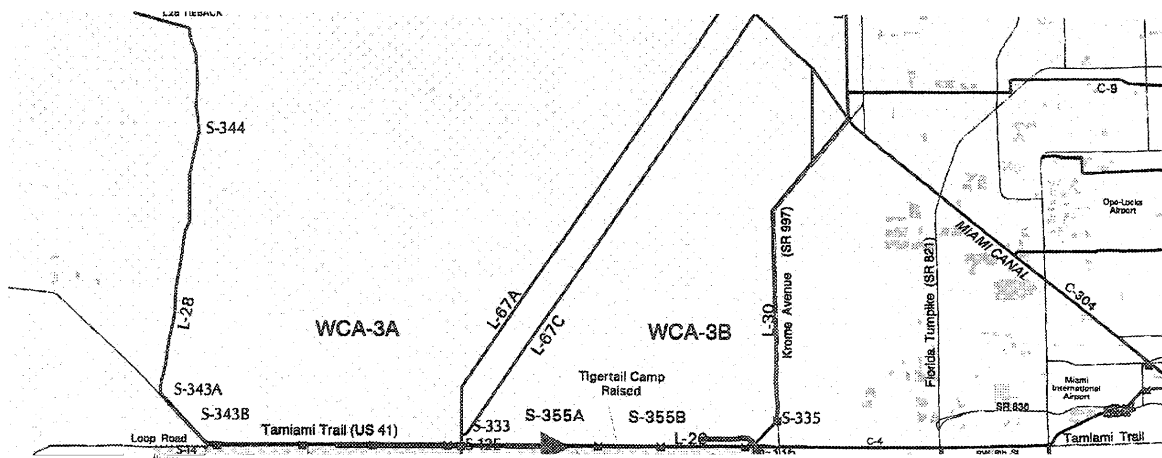
Although the Corps can estimate the recurrence frequency of a given rainfall event based on long term meteorological records, it cannot predict the other three conditions with confidence. Therefore, it is difficult to project the frequency or duration of such overflow events. However, during the 31 year period of record, there were 44 tropical storms that could have triggered the pre-storm operations, but only if other antecedent conditions were appropriate. The pre-storm operation was not modeled in the regional simulation of Alternative 7a and 7b but the modeling results indicate that during the 31 year period of record, the L-31N canal stage above S-174 would exceed 5.1 feet 2% of the time, at which time S-332B would be triggered to pump up to 500 cfs causing weir overflow into the Park (see page A-102 in the Engineering Appendix).

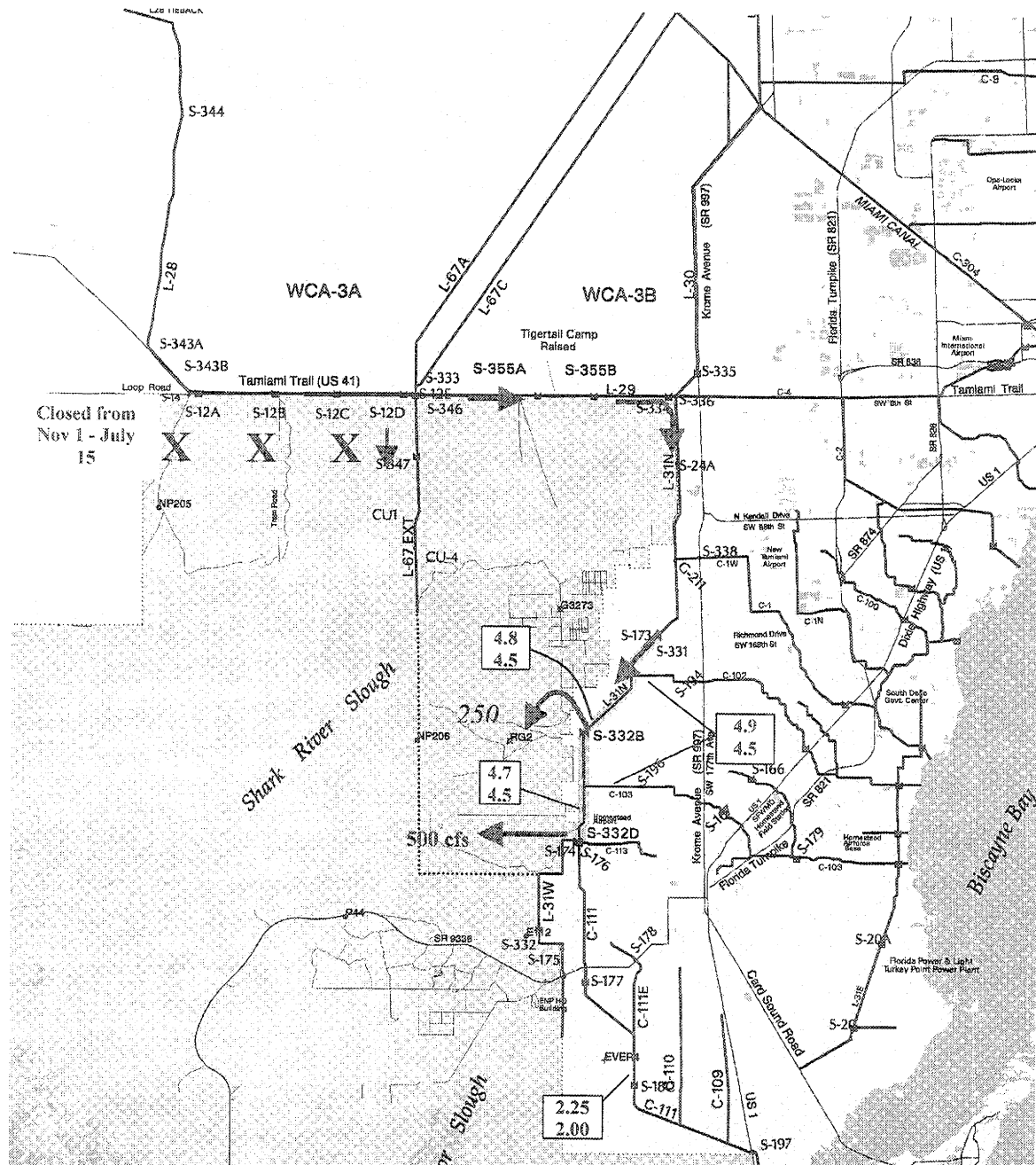
the structure for future operations when the levee system designed to protect 8.5 SMA is built. According to DOI, the environmental objective of increasing discharge at S-333



Proposed S-332B Seepage Basin	
Interim Operating Plan for Protection of the Cape Sable Seaside Sparrow	
Not to Scale	Drawn by:
February 2001	Approved By:
Date:	
00.0377	
Figure 4	







**Table 2.1. Description of 95Base Simulation**

	<b>95Base Modified 2 (Test 7 Phase I)</b>
Regulation Schedule	C&SF regulation schedules prior to ISOP.
S-343 A/B and S-344	Per the above WCA-3A regulation schedule.
S-12 A/B/C/D	Operated according to current regulation schedule, which includes rainfall plan target. Split 10/20/30/40 percent west to east.
S-333: G-3273 < 6.8'	S-333 open to deliver 55% of Shark Slough target flows as per rainfall plan target (rainfall formula + WCA-3A regulatory discharge).
S-333: G-3273 > 6.8'	S-333 closed
L-29 constraint	8.0 ft
S-355A&B	Regulatory releases are constrained by L-29 and G-3273 triggers.  <div style="text-align: center;">           Dry    Wet            Open 8.50    8.50            Close 6.50    6.50         </div>
S-337	Water supply only
S-151	Per the above WCA-3A regulation schedule.
S-334	Closed
S-332B	Non-existent
S-332B Seepage Reservoir	Non-existent
S-332D	Non-existent
S-332	Operated according to Taylor Slough Rainfall plan with 465 cfs capacity, subject to 165 cfs limitations from Mar 1 to Jul 15.
S-175	<div style="text-align: center;">           Dry    Wet            Open 4.7    4.7            Close 4.3    4.3         </div>
S-194	<div style="text-align: center;">           Dry    Wet            Open 5.3    5.3            Close 4.8    4.8         </div>
S-196	<div style="text-align: center;">           Dry    Wet            Open 5.3    5.3            Close 4.8    4.8         </div>
S-176	<div style="text-align: center;">           Dry    Wet            Open 5.00    5.00            Close 4.75    4.75         </div>
S-18C	<div style="text-align: center;">           Dry    Wet            Open 2.6    2.6            Close 2.3    2.3         </div>

Notes:

1. South Florida Water Management Model (SFWMM) version 3.8 was used in continuous simulation mode (31 year simulation using 1965 to 1995 climatic data set) to simulate 95Base Modified 2.
2. No changes to operational criteria of 95Base Modified 2 (includes Test7 Phase I criteria) for structures not listed in the table above.

RPA 02	
WCA-3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb 11. No deviation in WCA-2A regulation schedule.	WCA-3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb 11. No deviation in WCA-2A regulation schedule.
independent of WCA-3A	Closed Nov 1 to July 15 independent of WCA-3A levels.
Jul 15;	S-12A closed Nov 1 to Jul 15;
Jul 15;	S-12B closed Jan 1 to Jul 15;
Jul 15;	S-12 C closed Feb 1 to Jul 15;
ly according to WCA-3A	S-12D operated normally according to WCA-3A
inder of the year, S-12A,	schedule. For the remainder of the year, S-12A,
me schedule.	B, and C followed the same schedule.
target to NESRS, plus as	55% of the rainfall plan target to NESRS, plus as
45% that the S-12s can't	much of the remaining 45% that the S-12s can't
rough S-334; and subject	discharge to be passed through S-334; and subject
which are 1350 cfs at S-	to capacity constraints, which are 1350 cfs at S-
ge limit, and canal stage	333, L-29 maximum stage limit, and canal stage
34.	limits downstream of S-334.
discharge through S-333	Pass 60% of regulatory discharge through S-333
capacity (1350 cfs)	subject to S-333 design capacity (1350 cfs)
	9.0 ft
constrained by L-29 and	Regulatory releases are constrained by L-29 and
	G-3273 triggers.
	Dry Wet
	Open 8.50 8.50
	Close 6.50 6.50
	Water supply only
regulation schedule.	Per the above WCA-3A regulation schedule.
	Water supply only
sign capacity from Aug 1	Pumped up to 500 cfs design capacity from Aug 1
rom Feb 1 to Jul 31.	to Jan 31 and to 165 cfs from Feb 1 to Jul 31.
	Dry Wet
	On 5.00 5.00
	Off 4.80 4.80
	Closed



**Table 2.3. Description of ISOP 2000**

	ISOP 2.1 (ISOP 2000)

**Table 2.4. Description of ISOP 2001**

	<b>ISOP-9dR (ISOP 2001)</b>
Regulation Schedule	Deviation schedule for WCA-3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb 11. No deviation in WCA-2A regulation schedule.
S-343 A/B and S-344	Closed Nov 1 to July 15 independent of WCA-3A levels.
S-12 A/B/C/D	S-12A closed Nov 1 to Jul 15; S-12B closed Jan 1 to Jul 15; S-12 C closed Feb 1 to Jul 15; S-12D was operated normally according to WCA-3A schedule. For the remainder of the year, S-12A, B, and C followed the same regulation schedule.
S-333: G-3273 < 6.8'	55% of the rainfall plan target to NESRS, plus as much of the remaining 45% that the S-12s can't discharge to be passed through S-334; and subject to capacity constraints, which are 1350 cfs at S-333, L-29 maximum stage limit, and canal stage limits downstream of S-334.
S-333: G-3273 > 6.8'	No discharge to NESRS; release 55% of the rainfall plan target, plus as much of the remaining 45% that the S-12s can't discharge through S-333 and S-334, subject to capacity constraints.
L-29 constraint	9.0 ft
S-355A&B	Not modeled
S-337	Regulatory releases as per WCA-3A deviation schedule.
S-151	Per the above WCA-3A regulation schedule.
S-334	Same as in 95Base except that it also may pass all or part of S-333 releases to the SDCS, depending on stage at G-3273.
S-332B	Pumped up to 325 cfs from Jun through Jan; and 125 cfs from Feb through May. <div style="margin-left: 40px;"> Dry    Wet  On    4.70    4.70  Off    4.20    4.20 </div>
S-332B Seepage Reservoir	160 acres with emergency overflow
S-332D	Pumped up to 500 cfs from Jul 16 to Nov 31; 325 cfs from Dec 1 to Jan 31; and 165 cfs from Feb 1 to Jul 15

**Table 2.5. Description of Alternative 6**

	Alternative 6									
Regulation Schedule	Deviation schedule for WCA-3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb 11. No deviation in WCA-2A regulation schedule.									
S-343 A/B and S-344	Closed Nov 1 to July 15 independent of WCA-3A levels.									
S-12 A/B/C/D	S-12A closed Nov 1 to Jul 15; S-12B closed Jan 1 to Jul 15; S-12C closed Feb 1 to Jul 15; S-12D operated according to WCA-3A regulation schedule. Follow WCA 3A regulation schedule after Jul 15.									
S-333: G-3273 < 6.8'	55% of the rainfall plan target to NESRS, plus as much of the remaining 45% that the S-12s can't discharge to be passed through S-334; and subject to capacity constraints, which are 1350 cfs at S-333, L-29 maximum stage limit, and canal stage limits downstream of S-334.									
S-333: G-3273 > 6.8'	No discharge to NESRS; release 55% of the rainfall plan target, plus as much of the remaining 45% that the S-12s can't discharge through S-333 and S-334, subject to capacity constraints.									
L-29 constraint	9.0 ft									
S-355A&B	<table><tr><td></td><td>Dry</td><td>Wet</td></tr><tr><td>Open</td><td>8.50</td><td>8.50</td></tr><tr><td>Close</td><td>6.50</td><td>6.50</td></tr></table>		Dry	Wet	Open	8.50	8.50	Close	6.50	6.50
	Dry	Wet								
Open	8.50	8.50								
Close	6.50	6.50								
S-337	Regulatory releases as per WCA-3A deviation schedule.									
S-151	Regulatory releases as per WCA-3A deviation schedule.									
S-334	Same as in 95Base except that it also may pass all or part of S-333 releases to the SDCS, depending on stage at G-3273.									
S-332B	Pumped up to <b>250 cfs from Jun through Feb</b> ; and 125 cfs from Mar through May. <table><tr><td></td><td>Dry</td><td>Wet</td></tr><tr><td>On</td><td>5.00</td><td>4.70</td></tr><tr><td>Off</td><td>4.30</td><td>4.00</td></tr></table>		Dry	Wet	On	5.00	4.70	Off	4.30	4.00
	Dry	Wet								
On	5.00	4.70								
Off	4.30	4.00								
S-332B Seepage Reservoir	400 acres with minimum overflow (if any)									
S-332D	Pumped up to 500 cfs from Jul 16 to Nov 31; 325 cfs from Dec 1 to Jan 31; and 165 cfs from Feb 1 to Jul 15. <table><tr><td></td><td>Dry</td><td>Wet</td></tr><tr><td>On</td><td>5.00</td><td>4.70</td></tr><tr><td>Off</td><td>4.80</td><td>4.20</td></tr></table>		Dry	Wet	On	5.00	4.70	Off	4.80	4.20
	Dry	Wet								
On	5.00	4.70								
Off	4.80	4.20								
S-332	Closed									
S-175	Closed									
S-194	Operated to maximize flood control discharges to coast <table><tr><td></td><td>Dry</td><td>Wet</td></tr><tr><td>Open</td><td>4.70</td><td>4.70</td></tr><tr><td>Close</td><td>4.20</td><td>4.20</td></tr></table>		Dry	Wet	Open	4.70	4.70	Close	4.20	4.20
	Dry	Wet								
Open	4.70	4.70								
Close	4.20	4.20								
S-196	Operated to maximize flood control discharges to coast. <table><tr><td></td><td>Dry</td><td>Wet</td></tr><tr><td>Open</td><td>4.70</td><td>4.70</td></tr><tr><td>Close</td><td>4.20</td><td>4.20</td></tr></table>		Dry	Wet	Open	4.70	4.70	Close	4.20	4.20
	Dry	Wet								
Open	4.70	4.70								
Close	4.20	4.20								
S-176	<table><tr><td></td><td>Dry</td><td>Wet</td></tr><tr><td>Open</td><td>4.85</td><td>4.80</td></tr><tr><td>Close</td><td>4.65</td><td>4.70</td></tr></table>		Dry	Wet	Open	4.85	4.80	Close	4.65	4.70
	Dry	Wet								
Open	4.85	4.80								
Close	4.65	4.70								
S-18C	<table><tr><td></td><td>Dry</td><td>Wet</td></tr><tr><td>Open</td><td>2.25</td><td>2.25</td></tr><tr><td>Close</td><td>2.00</td><td>2.00</td></tr></table>		Dry	Wet	Open	2.25	2.25	Close	2.00	2.00
	Dry	Wet								
Open	2.25	2.25								
Close	2.00	2.00								



**Table 2.6. Description of Alternative 7**

	<b>Alternative 7a</b>	<b>Alternative 7b</b>
	<b>No WCA-3A Regulatory Releases to SDCS or Shark Slough</b>	<b>WCA-3A Regulatory Releases to SDCS</b>
Regulation Schedule	Deviation schedule for WCA-3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb 11. No deviation in WCA-2A regulation schedule.	Deviation schedule for WCA-3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb 11. No deviation in WCA-2A regulation schedule.
S-343 A/B and S-344	Closed Nov 1 to July 15 independent of WCA-3A levels.	Closed Nov 1 to July 15 independent of WCA-3A levels.
S-12 A/B/C/D	S-12A closed Nov 1 to Jul 15;	S-12A closed Nov 1 to Jul 15;

	these conditions operations of S-335 would be infrequent.	
S-334	Closed	Pass all or partial S-333 flows Depending on stage at G-3273
S-338	Open 5.8 Close 5.5	Open 5.8 Close 5.4
G-211	Open 6.0 Close 5.5	Open 5.7 Close 5.3
S-331	Angel's Criteria	Angel's Criteria
S-332B  Note 1: There will be two 125-cfs pumps and one 75-cfs pump directed to the second detention basin. The remaining two 125-cfs pumps will be directed to the first detention basin. If possible, the 75-cfs pump will be designed so that it can be directed to either basin.  Note 2: A new indicator will be established for Subpopulation F and a new gauge will be installed about ½ mile west of the weir on the western edge of the retention area. Pumping will cease after 180 days of above ground hydroperiod at the new gauge during a year that runs from July 15 <sup>th</sup> to July 14 <sup>th</sup> . After water levels recede below ground, pumping can be resumed at a rate that maintains water elevations below ground at the gauge until the beginning of the next year.	Pumped up to 250 cfs* from Jun through Feb; and 125 cfs from Mar through May.  On 5.0 Off 4.7**  *This pumping rate is based on the assumption that there will be no overflow into the Park. If there is overflow into the Park, the pumping rate will be adjusted.  **If, after the first 30 days of operation, there is no observed drawdown at the pump, this stage level will be raised to 4.8	Pumped up to 250 cfs* from Jun through Feb; and 125 cfs from Mar through May.  On 4.8 Off 4.5  *This pumping rate is based on the assumption that there will be no overflow into the Park. If there is overflow into the Park, the pumping rate will be adjusted to eliminate overflow.
S-332B Seepage Reservoir	400 acres with no overflow to the west	400 acres with no overflow to the west
S-332D	Pumped up to 500 cfs from Jul 16 (or the end of the breeding season, as confirmed by FWS) to Nov 31; 325 cfs from Dec 1 to Jan 31; and 165 cfs* from Feb 1 to Jul 15. Meet Taylor Slough Rainfall formula (No L-31W constraint)  On 4.85 Off 4.65  *New information will be sought to evaluate the feasibility of	Pumped up to 500 cfs from Jul 16 (or the end of the breeding season, as confirmed by FWS) to Nov 31; 325 cfs from Dec 1 to Jan 31; and 165 cfs* from Feb 1 to Jul 15. Meet Taylor Slough Rainfall formula (No L-31W constraint)  On 4.7 Off 4.5  *New information will be sought to evaluate the feasibility of

	modifying the 165 cfs constraint	modifying the 165 cfs constraint
S-332	Closed	Closed
S-175	Closed	Closed
S-194	Open 5.5 Close 4.8	Operated to maximize flood control discharges to coast Open 4.9 Close 4.5
S-196	Open 5.5 Close 4.8	Operated to maximize flood control discharges to coast Open 4.9 Close 4.5
S-176	Open 5.0 Close 4.75	Open 4.9 Close 4.7
S-177	Open 4.2 (see S-197 open) Close 3.6	Open 4.2 (see S-197 open) Close 3.6
S-18C	Open 2.6 Close 2.3	Open 2.25 Close 2.00
S-197	<p>If S-177 headwater is greater than 4.1 or S-18C headwater is greater than 2.8 open 3 culverts</p> <p>If S-177 headwater is greater than 4.2 for 24 hours or S-18C headwater is greater than 3.1 open 7 culverts</p> <p>If S-177 headwater is greater than 4.3 or S-18C headwater is greater than 3.3 open 13 culverts</p> <p>Close gates when all the following conditions are met:</p> <ol style="list-style-type: none"> <li>1. S-176 headwater is less than 5.2 and S-177 headwater is less than 4.2</li> <li>2. Storm has moved away from the basin</li> <li>3. After Conditions 1 and 2 are met, keep the number of S-197 culverts open necessary only to match residual flow through S-176. All culverts should be closed if S-177 headwater is less than 4.1 after all conditions are satisfied.</li> </ol>	<p>If S-177 headwater is greater than 4.1 or S-18C headwater is greater than 2.8 open 3 culverts</p> <p>If S-177 headwater is greater than 4.2 for 24 hours or S-18C headwater is greater than 3.1 open 7 culverts</p> <p>If S-177 headwater is greater than 4.3 or S-18C headwater is greater than 3.3 open 13 culverts</p> <p>Close gates when all the following conditions are met:</p> <ol style="list-style-type: none"> <li>1. S-176 headwater is less than 5.2 and S-177 headwater is less than 4.2</li> <li>2. Storm has moved away from the basin</li> <li>3. After Conditions 1 and 2 are met, keep the number of S-197 culverts open necessary only to match residual flow through S-176. All culverts should be closed if S-177 headwater is less than 4.1 after all conditions are satisfied.</li> </ol>